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Candidate's Answer Paper
(Examination Paper A - Electricity/Mechanics)

The present invention relates to a card reading/writing apparatus.

Such an apparatus is particularly usable in public telephones operated by prepaid telephone cards.

In the past, public telephones used to include a coin cashing apparatus and a coin box. Now the general tendency is to operate public telephones by means of prepaid telephone cards thereby avoiding the necessity for a coin box. This means that there is no longer a temptation for criminals to break into the telephones, which increases the economy of public telephones.

A commonly used type of prepaid telephone card, known as a "chip card", has a tiny integrated circuit or "chip" embedded therein. This chip, which is extremely difficult to reproduce fraudulently, stores a numeral value representing a credit and is electrically connected to contact pads of the card which are flush with the surface on one side of the card so as to be exposed. A user inserts such a chip card into a reading/writing apparatus of the telephone so that the contact pads are connected through said apparatus to control circuitry of the telephone. The credit value stored in the chip of the card is read and, during a telephone call, it is continuously debited by writing in the chip. At the end of the telephone call the chip card is returned to the user.

It is desirable that, during a telephone call, the card be inaccessible from the outside of the telephone to avoid fraudulent manipulations, for example the insertion of a fake card (with no chip) whose contact pads are connected to an electronic circuit external to the card, which circuit simulates the chip of an authentic card.

Document I describes a known telephone with a chip card reading/writing apparatus having a shutter that, during a telephone call, prevents access from the outside to an inserted chip card.

A problem associated with the shutter disclosed in Document I is that it has a relatively large exposed surface that could be pierced to provide a passage for conductors connecting the contact pads of an inserted fake card to an external electronic circuit.

Another problem associated with the shutter disclosed in Document I is that an external electronic circuit could be arranged in the recess between the shutter and the insertion slot.

The object of the invention is to provide an apparatus that reduces further the possibilities of frauds in the use of such chip card operated telephones.

This object is achieved by an apparatus as claimed in claim 1.

With the apparatus described in claim 1, the arrangement of the slot and the closure member makes it impossible to bring a fake card associated with an external electronic circuit into the reading/writing position and then to bring the closure member to the closed position.

Furthermore, only a relatively small portion of the closure member is accessible from the outside in the closed position thereof.

An embodiment of the invention is characterised in that (claim 7). According to this provision, the contact pins of the contact member never come into contact with the plastic laminate of the card avoiding the accumulation of dirt which has been observed in apparatus such as the one disclosed in document I where the contact blades slide on the card.

An embodiment of the invention is characterised in that (claim 2) - since the solenoid acts only on the latch lever and does not provide the force necessary to move the closure member, it requires very low energy.

1. A card reading/writing apparatus comprising a housing (2, 3) having a slot (1) for inserting a card (C) into said housing, a closure member (4) having an open position and a closed position; in said closed position said closure member preventing access to said card inserted into said housing; characterised in that in said closed position said closure member (4) is between said slot (1) and said card (C) for isolating said card from said slot.
2. An apparatus, according to claim 1, characterized in that it comprises carriage means (10) for transporting said card (C) to a reading/writing position beyond said slot inside said housing, said carriage means being operatively connected to said closure member (4) for locking said closure member in said closed position when said card is in said reading/writing position.
3. An apparatus, according to claim 2, characterized in that said closure member (4) is connected to said carriage means (10) by a lever means (30, 40, 41) comprising a latch means (44, 45, 46), said latch means being operated by a solenoid means (48) for locking said closure member in at least said closed position.
4. An apparatus, according to any of the preceding claims, characterized in that said carriage means (10) comprises a frame (11) and a resilient member (13), the leading edge of said card being frictionally clamped between said frame and said resilient member.
5. An apparatus, according to one or more of the preceding claims, characterized in that said carriage means (10) is driven by an actuation rod (3) said actuation rod extending in the direction of insertion of said card and having one end protruding through an aperture of said housing for actuation by a user in contrast to first spring means (33).
6. An apparatus, according to one or more of the preceding claims, characterized in that it comprises optical sensor means (14, 15) for detecting when said carriage means (10) arrives at said reading/writing position.
7. An apparatus, according to one or more of the preceding claims, characterized in that it comprises a contact member (20) moving relatively to said carriage means (10), said contact member having a rest position and a contact position; in said contact position, said contact member making contact with said card, in said reading/writing position.
8. An apparatus, according to one or more of the preceding claims, characterized in that it comprises an inclined ramp means (24) provided at said housing (2) and cooperating with said contact member (20) to move said contact member to said contact position as said carriage moves said card to said reading/writing position.

9. An apparatus, according to one or more of the preceding claims, characterized in that said contact member (20) has contact pins (21) moving in said contact member, said contact pads (CP) provided on said card.
10. An apparatus, according to one or more of the preceding claims, characterized in that said contact member (20) has a protrusion (27) adapted to engage a recess (16) provided at said carriage means (10) for locking said contact member in said contact position.
11. An apparatus, according to claim 1, characterized in that said slot (1) has dimensions which substantially correspond to the cross-section of said card (C).

Note to the Examiner

To offer the broadest protection possible, it may be desirable to file two more separate applications having claims directed to:

- the construction of the contact member (20)
- the latch (44, 45, 46) and solenoid (48) system.